



PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Article 36 and Rule 70)

Applicant's or agent's file reference PC3-008		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA416)	
International application No. PCT/US 02/30729	International filing date (day/month/year) 27.09.2002	Priority date (day/month/year) 28.09.2001	
International Patent Classification (IPC) or both national classification and IPC C07C17/10			
Applicant PCBU SERVICES INC.			
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 8 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 19 sheets.</p>			
<p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the opinion</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input checked="" type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p>IV <input type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input type="checkbox"/> Certain defects in the international application</p> <p>VIII <input type="checkbox"/> Certain observations on the international application</p>			
Date of submission of the demand 23.04.2003		Date of completion of this report 20.02.2004	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized Officer Seufert, G Telephone No. +49 89 2399-8330 	

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/US 02/30729**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*):

Description, Pages

2-4, 12, 14-25, 27, 29-36, 38-51 as originally filed

1, 5-11, 13, 26, 28, 37, 52 received on 06.02.2004 with letter of 06.02.2004

Claims, Numbers

1-63 received on 06.02.2004 with letter of 06.02.2004

Drawings, Sheets

1/7-7/7 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

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5. ☒ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

see separate sheet

6. Additional observations, if necessary:

III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application,

☒ claims Nos. 20-63

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☒ no international search report has been established for the said claims Nos. 20-63

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

☐ the written form has not been furnished or does not comply with the Standard.

☐ the computer readable form has not been furnished or does not comply with the Standard.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-19
	No: Claims	
Inventive step (IS)	Yes: Claims	19
	No: Claims	1-17
Industrial applicability (IA)	Yes: Claims	1-19
	No: Claims	

2. Citations and explanations

**INTERNATIONAL PRELIMINARY
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International application No. PCT/US 02/30729

see separate sheet

Reference is made to the following documents:

D1 US-A-5043491
D2 US-A-5068472
D3 EP-A-539989
D4 US-A-6018083
D5 US-A-5057634

III. Non establishment of opinion

1. According to Rule 66.1e the International Preliminary Examination Authority is not required to carry out an examination on subject-matter for which no search report as been established.

An objection of lack of unity has been raised by the International Search Authority together with an invitation to pay additional search fees. These search fees have not been paid and therefore the search report has been established only for the first invention. As a consequence only the first invention is subject of the international preliminary examination.

The amended claims 1-63 do not overcome the objection of lack of unity. The first invention is reflected in claims 1-19. Thus, only the subject-matter of claims 1-19 has been examined. Amended claim 20 is not a dependent claim, contrary to the applicant's observations submitted with the dependent claims. It was also not included in the searched subject-matter of the first invention.

2. The amendments

(a) "different from the first temperature" and

(b) "C-3 reactant comprising one or more..."

have been considered to go beyond the disclosure as filed (rule 70.2 (c) PCT).

The International preliminary examination authority could not find a basis in the application for the amendment (a). At various places in the application it is mentioned that the second temperature is higher than the first (see for examples description page 8, lines 27-28, page 11, lines 9-10 and 15). However, the expression "different from the first temperature" also includes the possibility that the second temperature is lower than the first.

With regard to the definition of the C-3 reactant, a basis for a "C-3 reactant

comprising one or more..." could not be found in the application as filed.

Wherever the C-3 reactant is mentioned in the application as filed, it is clear that it refers to a C-3 compound or mixtures of C-3 compounds. The term comprising means that it can contain other compounds as well.

Consequently, the present report has been established as if this amendments had not been made, which effectively means amendment (a) has been completely disregarded and for amendment (b) the original supported disclosure of "non perhalogenated hydrocarbons having three carbon atoms" as been considered.

Furthermore it seems that also some of the amendments in the description are not merely corrections of clerical or typographical errors, for example the introduction of "exemplary" at various places, the introduction of "one or more of high temperature reaction conditions" on page 11, line 3 or "can be prepared" instead of "were prepared" on page 13, line 25.

V. Reasoned statement under Art. 35(2) PCT with regard to novelty, inventive step and industrial applicability

Novelty

Claim 1 of the present application refers to a method for the preparation of 2,2-dichloro-1,1,1,3,3,3-hexafluoropropane ($\text{CF}_3\text{CCl}_2\text{CF}_3$, CFC-216aa) comprising contacting non perhalogenated hydrocarbons having 3 carbon atoms with chlorine and HF in the presence of a first catalyst at a first temperature to form a C-3 product comprising a C-3 perhalogenated compound, wherein the first catalyst comprises chromium and the first temperature is less than 450°C and contacting the C-3 product with HF in the presence of a second catalyst at second temperature to form CFC-216aa.

Document D1, which may be considered as the most relevant prior art discloses the chlorofluorination of a member of the group of propane, propene or partially halogenated C-3 hydrocarbons with Cl_2 and HF in the presence of a metal catalyst at a first temperature between 200 and 460°C (D1, table I) to produce $\text{CF}_3\text{CCl}=\text{CCl}_2$. This product is then chlorofluorinated at a second temperature between 300 and 500°C to produce $\text{CF}_3\text{CClFCF}_3$. However, CFC-216aa is also

produced and in rather high amounts especially at around a temperature of 400°C (see D1, steps (a) and (b), column 3, lines 19-60, column 8, line 48 - column 9, line 6, fig.). D1 also explicitly discloses the use of a chromium catalyst as the first catalyst in combination with a temperature of 450°C.

For the mere formal reason that the combination of a chromium catalyst with temperatures below 450°C is not explicitly mentioned in D1 the independent claim 1 and the dependent claims 2-19 appear to meet the requirement of Art. 33(2) PCT.

Inventive step

The technical advantages of the presently claimed process are the low amount of undesirable isomers, especially $\text{CF}_3\text{CF}_2\text{CF}_3$ (FC-218). However, document D1 also shows the formation of low amounts of $\text{CF}_3\text{CF}_2\text{CF}_3$, see D1, fig.

The problem to be solved by the present invention is considered as providing an alternative chlorofluorinating process.

The problem has been solved by the claimed process (see application).

However, the limitation to the use of a chromium catalyst at a temperature below 450°C in the first chlorofluorination step may render the subject-matter of claim 1 novel over D1 but it does not render it inventive, contrary to the applicant's observation. D1 already discloses a two step chlorofluorination process. The temperature of the first reaction step overlaps broadly with the presently claimed temperature (in most examples it is also below 450°C) and metal catalysts in general have been considered suitable in the chlorofluorination process of D1. The use of a chromium catalyst at a temperature below 450°C is thus not considered to be inventive. Furthermore, D1 discloses in example 13 the use of a chromium catalyst at a temperature of 450°C, which was originally included in the scope of claims. All variants covered by a claim are initially regarded as equivalent. By incorporating a prior art process the applicant has presented his presently claimed process as equivalent to that of the prior art. The claimed process is thus not inventive (Art. 33(3) PCT).

Furthermore, the subject-matter of claim 2 and 3 is not considered as involving an

inventive step (Art. 33(3) PCT) for the following reasons.

The reaction of CFC-216 with HF in the presence of a catalyst to form 2-chloro-1,1,1,2,3,3,3 heptafluoropropane (CFC-217ba) as well as the reaction of CFC-217ba with H₂ to HFC-227ea are well known reactions in the prior art (see D2 or D3). The subject-matter of claims 2 and 3 are therefore merely an association of known steps functioning in their normal way and not producing any non-obvious working interrelationship. No inventive skills are necessary.

Dependent claims 5-17 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step, the reasons being as follows: These features are known in the prior art (see D1-D3).

The subject-matter of claim 4 is not considered to be inventive. It appears that the claimed stability is only achieved at a certain level of water in the hydrodehalogenation reaction (see application pages 40-42 and fig. 7).

The subject-matter of the dependent claim 19 appears to satisfy the requirement of Art. 33(3) PCT.

Industrial applicability

There are no objections with regard to the industrial applicability of the subject-matter of claims 1-19.